

# GUINEA PIGS FOR MEAT PRODUCTION

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## ECHO TECHNICAL NOTE

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### INTRODUCTION

The high protein and high concentration of B vitamins found in meat make it an ideal part of the diet, very difficult to replace by plant foods, even with grain legumes that are nutritionally the closest plant foods to meat. Yet production of meat on the small farm almost dictates a way of life with several disadvantages. If small animals are raised in pens they usually require purchased concentrates or grains used for the family, at least as part of the diet. If allowed to roam freely they make it impossible to maintain a dooryard vegetable garden, and make good hygiene difficult. Furthermore, if the family cannot eat the entire animal at one meal, refrigeration is required or other preservation techniques.

The guinea pig or cavy, *Cavia porcellus*, is a rodent that was domesticated in the Andes as a source of meat. Because it is a small animal it can be eaten by a small family in one meal and does not require refrigeration. It is herbivorous and becomes accustomed to many sorts of feed. The meat is much like rabbit, and is low in fat content. Furthermore, the cavy multiplies rapidly, but not at the rate that folk literature would suggest. With breeding as recommended here, one pair of cavies could produce about 260 new pairs in 2 years.

Because of these characteristics the cavy should be tried widely as a source of meat for the household as well as to sell.

Nevertheless, production of cavies requires a year-round source of herbaceous feed. To some extent the feed can be supplied as hay during the dry season or even as purchased alfalfa pellets (rabbit food), or stored roots and tubers can be used. The cavy does not normally eat cooked foods from the table but will eat some of the scraps from uncooked fruits and vegetables. More details of feeds for cavy are given later.

While the cavy is often produced almost by neglect, good housing is highly desirable. This includes provisions for maintaining cavies separated by sex and age (see later). Furthermore, cavies do have their parasites and diseases, best avoided by adequate housing.

## RACES OF CAVY AND BASIC BIOLOGY

The cavy probably originated from a wild species, *Cavia culleri*, in the highland of the Andes because it can be mated successfully and produces fertile offspring with this species. Mankind has selected the cavy for large size, resulting in *Macabeo* which is preferred for meat production. However, cavies have also been bred as pets or fancy animals for show, resulting in breeds that are widely recognized. These are frequently distinguished by hair type (silky, wiry, satin or hollow) and length (short, intermediate, long) as well as color or color pattern. Among the races are the Abyssinian (short, wiry hair in rosettes), the American (short, silky hair), the Peruvian (dense, silky, long hair), the Satin (hollow hairs giving a sheen), and the Silkie (long silky hair). There are other races.

[EDITOR: I called Heifer Project's Jim DeVries (June 1990) for an update on progress in obtaining the much larger cavies that have been developed in Ecuador and Peru. Heifer has been trying to obtain them for their own distribution program for three years. They are hopeful that by 1991 they may have a few. These improved strains have been developed by local researchers and are in great demand throughout the cavy growing areas of South America. If you live in Ecuador or Peru and have not heard of them, perhaps you could write to Heifer Project, P. O. Box 808, Little Rock, AR 72203 for the name of the local source of a male to improve your stock. The rest of us will just have to be patient.]

From the standpoint of producing cavies for meat, the long-haired races requiring special care should be avoided. Large, young, healthy animals should be selected to begin breeding.

The cavy seldom exceeds 3 pounds in weight and many mature cavies are less than one pound. It does not gnaw, cannot climb, does not bite, but is timid, and can scratch when afraid. Its senses of smell and hearing are very sharp. Cavies are noisy. They squeal when hungry, or when attacked and murmur as they eat. Their cry of cooe is the source of a common name in the Andes, cui or curi. Cavies like to live in cages with others. They often seek out dark places where they can run and hide.

The embryo of the cavy opens its eyes as many as ten days before birth. At birth the young weigh from 40 to 140 g (1.5-5 ounces), are fully developed, can see, smell, walk, run, eat all but hard foods, and even survive without the mother if necessary. Nevertheless, they grow more rapidly if kept with the mother for 2-3 weeks. The young are sometimes accidentally injured or, less frequently, killed by both males and females and thus need places to hide within the cage.

The female comes into heat when as young as 3 weeks of age, and thereafter every 15-16 days. The mature female comes into heat a few hours after giving birth. After mating, gestation takes about 68 days. The litter size varies from 1 to 7. Litters of 2 are very common. Cavies have only two functional breasts. Babies of larger litters are often weaker, poorly fed, and may die early.

In practice it is better to breed females (sows) at 3 months of age and males (boars) at 4, so that the better (larger, healthier, more active) can be selected. Furthermore, although females are often mated immediately after giving birth, they are healthier if bred only once every three months.

Sterility among females is common, especially with age. If mated females do not produce within two months after spending one month with males they should be replaced. Females ought to be replaced after one and a half years, not only to avoid sterility but also to permit improvement by selection. Males can also be sterile. They should be replaced when not sexually active, or when suspected of sterility.

Young cavies increase rapidly in body weight and, after setting aside the largest for breeding, they can be eaten at 3-4 months after birth. It is not advantageous to maintain them longer as they will grow slower and less efficiently after 4 months of age. Cavies can live for up to seven years.

## MANAGEMENT CONSIDERATIONS

The system for managing cavies for meat production is of great importance in order to make it productive and economical. Unfortunately much less is known about management of cavies than of chickens, rabbits, pigs, and goats. Standardized systems have been developed in some instances, but have not been thoroughly tested. Although one management system will be suggested here, it may be modified by taking into account the biological facts and behavior of cavies, as suggested in the previous and in this section.

Cavies do not climb, and thus their cages need not be deep. They are often carried for convenience in rather shallow baskets. A depth of cage from 14 to 22 inches (36-55 cm) is recommended. A shallow cage permits hinging and lifting of the roof for inspection and cleanup. Cavies should be separated by sex and age. If two or more males are housed with one or more females, they may fight, and one male may be injured. Therefore, only one male at a time should be penned with females to be mated. However, boars without females can be housed together. Other cages might include young males, young females, pregnant females, and females and their young. The minimum floor space per animal is 0.75 sq. ft. (700 sq. cm.)

Cavies like to sleep on a solid floor. Therefore, a simple floor might consist of 1/2 x 1/2-inch hardware cloth, with some squares of plywood on which the cavies can sleep. A more elaborate system includes the construction of a double shelf 6-8 inches (15-20 cm) wide to the rear of the cage. This can be constructed from wood as a small, removable box. Females with young will seek refuge within the box while larger animals will sleep on the upper level.

Cavies are sensitive to drafts. Some sides or the back and sides can be of solid wood, while the front as well as the major part of the floor of hardware cloth. During cold or windy weather a curtain can be used over the hardware cloth sides.

Because cavies eat large quantities of feed, a system to supply it in quantity is necessary. Simply leaving the feed on the floor is unsatisfactory. The cavies will dirty their feed and then will be reluctant to eat it. A wide "V" shaped trough along the front of the cage is recommended. This must be open at the base so that the cavies can pull out feed. The lengths of pieces of feed must be adjusted to the width of the cages. The sections of the trough must be separated to avoid animals moving from one cage to another through the troughs.

## FEEDING CAVIES

Cavies are strict herbivores that will eat a wide variety of foods. There is some evidence that food preference is established by experience early in the life of the cavy, and it has been suggested that this is associated with the particular microorganisms that become established in the intestinal tract. Nevertheless, personal experience suggests that cavies can acquire new preferences. They are much more likely to adopt a new food when they are very hungry, and with time may acquire a taste for it. Cavies need large amounts of vitamin C, and this is best acquired through fresh foliage. Cavies will tire of the same food given continuously.

Among the kinds of food cavies will eat and that prove to be useful are uncooked household scraps from some fruits and vegetables, grasses in general, and foliage of many weeds and annual plants. Cavies do not like aromatic (strong smelling) foliage in general, or foliage known to be high in oxalic acid. It should be remembered that cavies prefer the tender and softer foliage, may reject older leaves, and cannot eat woody parts. The foliage of many trees is good food for cavies. Usually growing branches are cut and given to them. Trees that are known to be poisonous or rejected by cattle should not be used. Cavies will also eat edible roots and tubers, especially when very hungry. In general, they do not care for ripe fruits, but will eat pods and immature grains. Cavies usually do not eat hard grains and grain legumes.

Some leaves are poisonous to caviae but the evidence of which is not very clear. The leaves of species of the solanum family (e. g. tomato, pepper, and potato) are frequently rejected. Leaves known to be poisonous to humans should not be offered to caviae. The foliage of some grasses are known to be poisonous (probably due to hydrocyanic acid), usually over a long period, such as that of Kikuyo grass, *Pennisetum clandestinum*. Leaves and pods of legumes are likely to be poisonous and should be used with care. It is a good practice to vary the food in the diet according to what is available and to avoid overuse of any one grass, unless experience demonstrates its good effects. Quantities of very succulent food may cause bloating and death. Partial wilting reduces this problem.

Food for caviae may be particularly difficult to obtain during the dry season. When this occurs, alfalfa pellets can be used as feed. However, hay can be prepared in advance. Plant materials used for hay should be those that are known in advance to be acceptable foods for caviae. They can be cut and laid to dry in the sun and then stored in a dry shed until needed. When possible, a small planting of suitable feeds should be kept growing during the dry season in order to be able to give the caviae some fresh greens daily, and thus fill their vitamin C requirement.

A good food production system is vital to the exploitation of caviae for their meat. Except in places where wild or weedy feeds are available year around in abundance, this means plantings will have to be made or feed will have to be purchased occasionally. Caviae will eat day and night, and the amounts they eat will be surprising. Foods should be made available to caviae at all times. Water can be given as a precaution, but caviae will often obtain all the water they need from succulent foliage. The way that feeds are served to caviae will determine how efficiently they are used.

#### A SUGGESTED CAGE

A cage that should produce a minimum of 2 animals as food each week is given in figure 1. This cage is three square yards in area and is divided into 8 compartments, of unequal size, used for particular purposes and for a particular management system. The cage can be constructed of 1/2" x 1/2" hardware cloth and plywood paneling, as well as a variety of other materials. The roof of the cage opens and is propped to keep it open as necessary. The caviae cannot climb out. The front of each cage consists of a hardware cloth trough wider at the top than the bottom, where cut green feed is placed. Wood or hardware cloth separate sections of the trough corresponding to the sections of the cage. At the base of the trough is a solid food tray to permit feeding with alfalfa pellets. Each section of the cage has a double platform in the rear. The upper portion of the platform is 4 inches (10 cm) above the lower. Caviae will rest and sleep on these platforms. The sections of the cage are equipped with a drinking tube and nipple, not shown in the diagram so that water is available when needed. A cloth or plastic is hung from the front of the cage to reduce drafts. The cage is mounted on a frame so that urine, excrement, and small bits of food can drop to the ground. They can best be caught on loose soil that is periodically removed and composted, then replaced with fresh soil. See diagram on separate sheet.

#### STARTING UP

Since one may not be certain of the fertility of the initial animals or of the status of the females, it is desirable to identify each animal in a notebook in order to follow its progress. This can be done by observing its distinctive markings and hair characteristics. Three males and 15 females are necessary. Place five females that most appear to be pregnant in the birth cage. On day zero, place one male and five females in the breeding cage, and place the five remaining females in the pregnant female cage.

Management is based on a 30-day cycle. However the caviae require inspection and feeding twice daily. During the first three months several unplanned events can occur, as follows:

- If an animal dies, replace it from the 3-4 month old females.
- If a female gives birth unexpectedly, when available move her and her young to the birth cage.

- If an animal fights, observe for a while. Cavies often adjust to each other. If an animal is too constantly aggressive, replace it.
- At any time, remove males or females from the fattening cages to butcher. Mature males and females that are replaced can also be butchered as desired.
- On day 30 (and subsequently at 30 day intervals):
  - Move the largest young males from the baby male cage to the male fattening cage.
  - Move the largest young females from the baby female cage to the female fattening cage.
  - Remove babies from their mothers and check their sex. Place males in the baby male cage and females in the baby female cage.
  - Remove male from breeding cage to a temporary cage, such as a deep bucket.
  - Remove females from breeding cage to a temporary cage, such as a deep box.
  - Place one fresh male in the breeding cage, and record in the record book.
  - Place the "spent" male from the bucket in the boar cage.
  - Move the females that are in the birth cage to the breeding cage. Record.
  - Move the females from the pregnant female's cage to the birth cage.
  - Move the females from the temporary cage or box to the pregnant female's cage.

One way to distinguish males from females is by noting mounting behavior or aggression. Take notes only on the breeding males and females. For each numbered male and female, record dates of breeding, and for females, dates of giving birth and number in the litter. Record when animals die, are butchered, or replaced. Number and record the color and hair characteristics of replacement males and females.

#### CRITERIA FOR REPLACING BREEDING CAVIES

- When a female has failed to give birth while in the breeding cage, replace her.
- When a female, after two litters, proves to be a small litter producer, compared to others, replace her (females bearing 3-4 young are preferred).
- After a female has produced 6 litters, replace her.
- If a male proves to be inactive sexually or sterile, replace him.

#### HEALTH AND DISEASES

It is believed that cavies cannot transmit any disease or parasites to humans. However, they are believed to be able to carry rat fleas and thus bubonic plague and marine typhus.

The health of cavies is maintained by sufficient green food, often partially wilted to avoid bloating. Cages should be self-cleaning (Hardware cloth floors) except for sleeping shelves and nooks for hiding. Cages should be dry, somewhat ventilated, but without drafts. Temperature extremes should be avoided. Cavies can be killed by rats and mongooses and by cats and dogs. Adequate housing can prevent attack by other animals.

After excessive drafts cavies may contract pneumonia, which is frequently fatal. They may be infected with a parasitic disease similar to coccidiosis and producing diarrhea. It is treated with the same drinking water additives used for chickens, but it is easy to avoid by using clean water and feed and proper housing.

Internal parasites have been a problem, avoided by correct housing and initial use of healthy stock. Medicines used for clearing other animals of parasites, used in low doses, have been effective.

As a general rule, cavies are considered to be relatively pest and disease free.

## **BUTCHERING AND COOKING CAVIES**

Cavies are killed by three techniques; A strong blow at the base of the head and neck with a pipe, by twisting and dislocating the neck, and by holding the body of the animal in one hand, placing a thumb at the junction of head and neck, then simultaneous stretching the body and pushing down with the thumb. All techniques require some practice to perfect.

Once killed, cavies are prepared for eating by two techniques. In the first, the hair of the cavies is softened by immersion in hot but not boiling water, followed by scraping. The abdomen is then opened and the animal is cleaned conventionally. In the second technique the animal is killed and immediately hung by its hind legs and the throat is cut and blood is drained. The skin of the abdomen is pulled forward and slit with knife or scissors. The animal is skinned conventionally and then cleaned.

The cleaned animal can be mounted on a spit and cooked in rotisserie fashion or can be cut into pieces and fried. However, because of its small size and the desirability of making maximum use, it is recommended that the meat be cut into several large pieces and boiled until soft. The meat can then be shredded and the small bones are removed. The meat is then included in soups, stews, or fricassees, which are seasoned conventionally.

The meat is dark, flavorful, and especially low in fat. The small intestine (tripe) of the cavy is often cut up, washed and boiled to eat. The heart, kidneys, and liver are relished.

[EDITOR: Heifer Project's Jim DeVries says they have several cavy projects in Africa. There the carcass is not skinned. The animals are gutted and the hair singed off. The meat is cut into small pieces and placed in the soup (sometimes after first roasting for added flavor). In Latin America the carcass is cooked whole in a broth and, at least for guests, an entire pig placed on his plate. The bones are placed on the side.]

## **OTHER USES OF CAVIES**

The fur of the cavy can be cured conventionally and pelts can be sewed into conventional garments or braided into ropes.

The manure is used in the home garden.

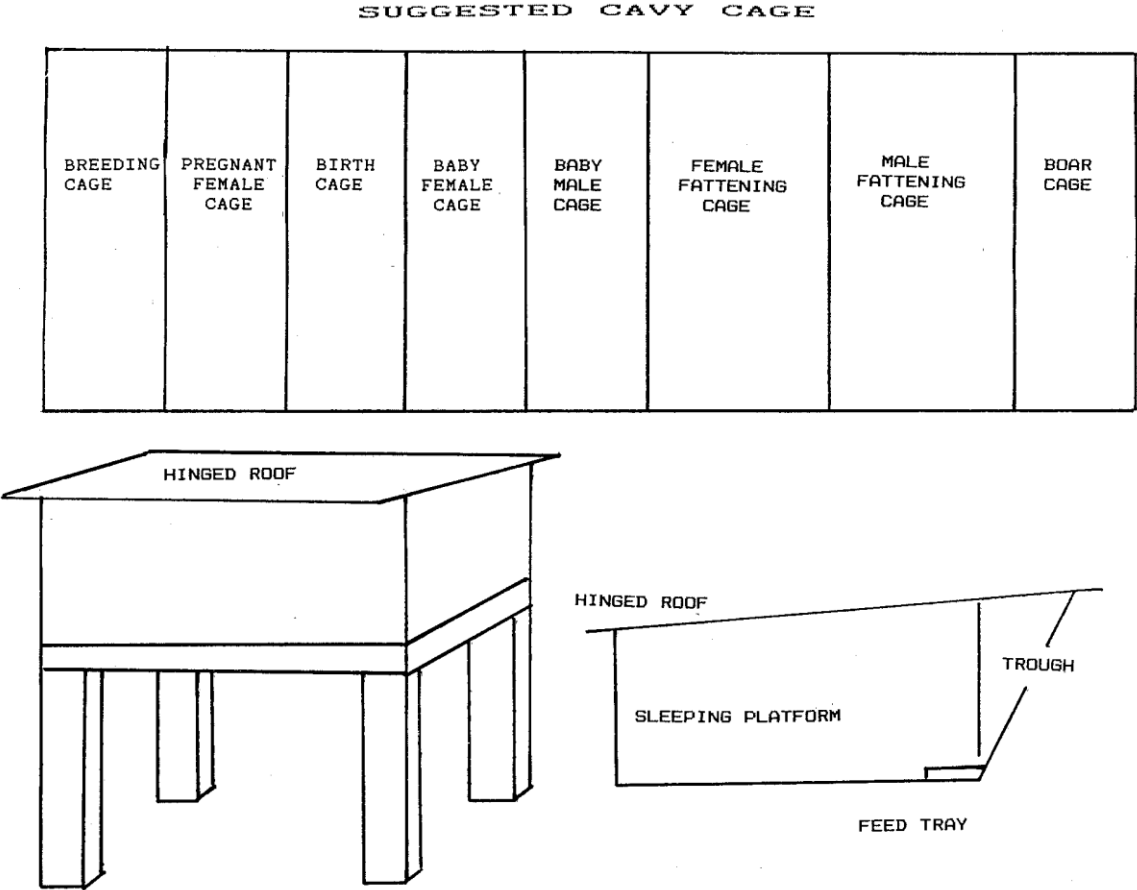


Figure 1: Example of a cage that should produce a minimum of two animals per week for food.